



Transition to a Safe Home Sleep Environment for the NICU Patient

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Of the nearly 3.8 million infants born in the United States in 2018, 8.3% had low birth weight (ie, weight <2500 g) and 10% were born preterm (ie, gestational age of <37 weeks). Ten to fifteen percent of infants (approximately 500 000 annually), including low birth weight and preterm infants and others with congenital anomalies, perinatally acquired infections, and other diseases, require admission to a NICU. Every year, approximately 3600 infants in the United States die of sudden unexpected infant death (SUID), including sudden infant death syndrome (SIDS), unknown and undetermined causes, and accidental suffocation and strangulation in an unsafe sleep environment. Preterm and low birth weight infants are 2 to 3 times more likely than healthy term infants to die suddenly and unexpectedly. Thus, it is important that health care professionals prepare families to maintain their infant in a safe home sleep environment as per recommendations of the American Academy of Pediatrics. Medical needs of the NICU infant often require practices such as nonsupine positioning, which should be transitioned as soon as medically possible and well before hospital discharge to sleep practices that are safe and appropriate for the home environment. This clinical report outlines the establishment of appropriate NICU protocols for the timely transition of these infants to a safe home sleep environment. The rationale for these recommendations is discussed in the accompanying technical report “Transition to a Safe Home Sleep Environment for the NICU Patient,” included in this issue of *Pediatrics*.

abstract

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INTRODUCTION

Sudden unexpected infant death (SUID), including sudden infant death syndrome (SIDS), is the leading cause of postneonatal mortality in the United States. In up to 95% of these cases, there are one or more environmental risk factors identified.¹ Preterm and low birth weight infants are 2 to 3 times more likely than healthy term infants to die

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suddenly and unexpectedly,^{2,3} so it is particularly important to model a safe home sleep environment in the NICU before a neonate is discharged from the hospital. The American Academy of Pediatrics (AAP), through the Committee on Fetus and Newborn, has recommended since 2008 that preterm infants be transitioned to a predominantly supine position by a postmenstrual age of 32 weeks to promote safe sleep, a recommendation supported by the AAP Task Force on Sudden Infant Death Syndrome (henceforth, “task force”).^{2,4,5} Because the recommendations for infant sleep safety at home also include other postnatal environmental factors (eg, use of a firm, flat sleep surface, avoidance of loose bedding or soft objects, a neutral thermal environment, room sharing without bed sharing, smoke-free environment), safe sleep recommendations for NICU patients should also address these factors. Recognizing that not all infants are ready for such a sleep environment by 32 weeks’ postmenstrual age, the task force recommends transitioning the infant to the safe home sleep practices as soon as he or she is medically stable and significantly before the anticipated discharge from the hospital.⁴

Studies have shown that NICU providers do not consistently support infant sleep safety recommendations.^{5–7} Researchers in a 2016 study of 96 NICU nurses found that only 53% strongly agreed that safe sleep recommendations make a difference in preventing SIDS, and only 20% strongly agreed that parents would model nurses’ behaviors at home.⁷ However, research from the well-baby nursery, community settings, and the NICU demonstrate that safe sleep education and modeling in these sites translate into increased

knowledge and improved safe sleep practices among new parents.^{8–11}

This clinical report reviews the evidence for common NICU sleep practices and provides guidance for transitioning the infant to a sleep environment that is safe and appropriate for the home environment.

SLEEP POSITION

Since 1992, back sleeping has been recommended for the reduction of sleep-related deaths. This recommendation, in conjunction with the Back to Sleep campaign in 1994, resulted in SIDS rates in the United States decreasing by 53% by 1999.¹² Prone and side sleep positions are associated with an increased risk of SIDS, and neither are recommended.⁴ The risk of SIDS for preterm and low birth weight infants in the prone position is potentially greater than that of healthy term infants.^{4,13} However, there are a number of scenarios in the NICU in which nonsupine positioning is applied for potential therapeutic benefit. Nonsupine positioning in the NICU in all cases can be used as a teachable moment with the family regarding eventual readiness for safe infant sleep positioning and environment.

Respiratory Distress and Chronic Lung Disease

Prone positioning is commonly used in infants with both acute and chronic respiratory distress. Preterm infants in the prone position have improved oxygenation and pulmonary function, including dynamic lung compliance and tidal volume, as well as less intrapulmonary shunting and improved thoraco-abdominal synchrony.^{14–16} In the supine position, some lung tissue is dependent to the heart and mediastinal structures, increasing potential for atelectasis. In addition,

in the supine position, abdominal contents may limit ventilation through opposition to the excursion of the diaphragm.^{14,17} A Cochrane review of positioning for acute respiratory distress in infants and children found small but statistically significant improvements in oxygenation and tachypnea with prone positioning.¹⁸ The benefit of prone positioning during the acute phase of respiratory disease (when infants are closely monitored) may outweigh the importance of modeling safe sleep positioning in the extremely preterm infant.

Data are more limited regarding potential benefits of prone positioning in the preterm infant with evolving chronic lung disease. The studies are small and have shown conflicting results.^{19–23} One study found higher oxygen saturations and functional residual capacity in the prone position but no difference in compliance or resistance in oxygen-dependent infants.¹⁹ Another study found prone positioning increased tidal volumes and minute ventilation but also increased work of breathing.²² Although undefined, at some point the diminishing benefits of prone positioning are outweighed by the concern of reinforcing a sleep position that increases the risk of SUID.

Airway Abnormalities

Although uncommon, there are congenital airway abnormalities that result in respiratory compromise, and some infants with these conditions may benefit from prone positioning. The benefit of prone positioning is particularly relevant in Pierre Robin sequence, in which there is gravity-dependent tongue-based obstruction.²⁴ Although infants with mild cases of Pierre Robin sequence will be stable sleeping supine and infants with severe cases will have early surgical

intervention, intermediate cases may be more challenging and achieve relief with prone positioning until they outgrow their airway obstruction.

Apnea of Prematurity

Some studies have suggested that the frequency and severity of apnea of prematurity may be decreased through prone positioning, but these studies showed mild benefit and were limited by small sample size.^{25,26} More recent studies have disputed this conclusion.^{27,28} A 2017 Cochrane review found no statistical differences in apnea, bradycardia, or oxygen saturations and concluded that body position was not relevant to controlling apnea frequency.²⁹ Nonsupine positioning should not be used as a strategy to decrease apnea of prematurity.

Gastroesophageal Reflux

Positioning has often been touted as a treatment of gastroesophageal reflux disease (GERD), but the risk of sudden unexpected death has decreased enthusiasm for this strategy. The AAP agrees with the recommendation of both the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition and the European Society for Pediatric Gastroenterology, Hepatology and Nutrition “not to use positional therapy (ie, head elevation, elevation of the head of the crib, lateral and prone positioning) to treat symptoms of GERD in sleeping infants.”³⁰ Studies have suggested less reflux when the infant is in the prone position versus the supine position, so it is acceptable to place an awake infant prone after feeding if the infant is continuously monitored.^{31,32} Although gastric emptying may be improved by placing the infant in the right lateral position, some studies have

demonstrated that when preterm infants are placed in the left lateral position after feeding, there is a decrease in the number of transient relaxations of the lower esophageal sphincter.³²⁻³⁵ However, infants should not be placed in an inclined or nonsupine position for sleep as treatment of GERD.

Hyperbilirubinemia

Prone positioning is sometimes used in alternation with supine positioning while infants are being treated with phototherapy for hyperbilirubinemia. However, a systematic review found supine positioning was equally effective to periodically turning infants.³⁶ The National Institute for Health and Clinical Excellence (NICE) in the United Kingdom stated that positioning has no significant influence on the mean change in serum bilirubin concentration or the duration of phototherapy for infants born at term.³⁷ As such, the NICE recommends infants be placed in the supine position while being treated with phototherapy to ensure consistent advice about SIDS risk.³⁷ Since the NICE recommendation, a study of infants born at ≥ 33 weeks' gestation compared supine with alternating positioning and found identical rates of decrease in total serum bilirubin concentration at 12 and 24 hours after initiation of phototherapy.³⁸ The consistency of the results in both term and preterm infants confirm that barring another medical condition requiring prone position, hyperbilirubinemia should be treated routinely in the supine position.

Neonatal Opioid Withdrawal Syndrome

The infant with neonatal opioid withdrawal syndrome (NOWS) is generally treated with supportive,

nonpharmacologic care designed to minimize stimulation and to support the infant's self-regulation.^{39,40} In one study, prone positioning was associated with decreased severity of NOWS scores and reduced caloric intake.⁴¹ Although prone positioning may be useful for monitored inpatients during the acute withdrawal phase of NOWS, it should be discontinued when possible and before hospital discharge to decrease SUID risk.

BEDDING AND POSITIONERS

Per AAP recommendations, infants at home should be placed on a flat, firm sleep surface (ie, crib, bassinet, portable crib, or play yard that conforms to the safety standards of the Consumer Product Safety Commission)^{2,42,43} covered by a fitted sheet with no other bedding. Because soft bedding and loose objects in the sleep environment can obstruct the infant's airway, increasing the risk of rebreathing, SIDS, and suffocation,⁴⁴⁻⁵² these items should not be in the sleep environment. Although bedding and positioners are often used for developmentally sensitive care and for treatment of plagiocephaly, these items should be removed from the sleep environment.

Developmentally Sensitive Care

Developmentally sensitive care is an important therapeutic intervention for preterm and other ill infants. However, because such care often may be inconsistent with provisions for a safe infant home sleep environment, staff should use demonstration of these techniques as a teachable moment with the family regarding eventual readiness for safe infant sleep positioning and environment.

Developmentally sensitive care refers to a broad category of

interventions designed to minimize the stress of the extrauterine environment and optimize the physical and neurodevelopmental outcomes for preterm and ill neonates.^{53,54} These may include therapeutic positioning, swaddling, or other strategies. Although there is controversy regarding the effectiveness of formalized programs for developmentally sensitive care, components of these approaches may improve short-term outcomes. Integration of developmentally sensitive care has been endorsed by professional organizations, such as the National Association of Neonatal Nurses, with development of guidelines and quality metrics.⁵⁴⁻⁶⁴

Therapeutic positioning keeps the infant contained and maintains the fetal midline position of flexion to support comfort and self-regulation.⁵⁵⁻⁵⁹ This positioning may involve the time-limited use of positioning devices, including blanket rolls and commercially available products. Without support from these devices, the preterm infant will lie flat and asymmetric with hips and joints abducted with abnormal rotation. Over time, this may lead to musculoskeletal and neurodevelopmental abnormalities, including upper extremity hyperabduction and flexion and generalized muscular rigidity.⁵⁵ Positioning devices are incompatible with a safe home sleep environment and, although the AAP encourages transitioning to a safe sleep environment at 32 weeks' postmenstrual age, not all infants will have achieved positional stability by this age, resulting in wide interpretation at the bedside.^{7,65-67} Through quality improvement research, some centers have developed programs for consistent timing and increased compliance with safe

sleep recommendations^{8,11,68-73} (see section on A Rational Approach to Transition of the NICU Patient to a Home Sleep Environment).

Positional or Deformational Plagiocephaly

Positional or deformational plagiocephaly (DP) (most commonly unilateral flattening of the parieto-occipital region, with compensatory anterior shift of the ipsilateral ear and anterior displacement of the ipsilateral forehead) results from unevenly distributed external pressure resulting in abnormal head shape.⁷⁴ DP is common in the NICU and may occur secondary to limitations on positioning, muscle tone, nursing care practices, and other medical conditions.^{75,76} Preterm infants are more susceptible to developing plagiocephaly attributable to decreased mineralization of the skull bones, increased prone positioning, placing the infant repeatedly on the same side and slower motor development. Although pediatric occupational and physical therapists frequently use a variety of positioning devices and supports to correct DP (and the often accompanying torticollis),⁷⁷⁻⁸⁰ these products should be removed before hospital discharge, because they are contrary to home safe sleep recommendations. Thus, home therapy should be limited to creating a nonrestrictive environment that promotes spontaneous physical movement and symmetrical motor development.^{81,82}

As infants who require developmentally sensitive care or treatment of DP mature and approach discharge readiness, an interdisciplinary, collaborative, and thoughtful approach is required to

determine how and when positioning devices should be discontinued and removed to achieve a safe home sleep environment. In addition, communication with and education of the infant's family are crucial to promote understanding of safe sleep practices and decrease the inappropriate use of the devices after hospital discharge.

SKIN-TO-SKIN CARE AND THE USE OF A SEPARATE SLEEP SURFACE

The benefits of skin-to-skin care (SSC) are numerous and include improved initiation and maintenance of breastfeeding, thermoregulation and glucose homeostasis, decreased crying, and cardiorespiratory stability.⁸³⁻⁸⁷ In preterm infants, SSC improves autonomic and neurobehavioral maturation and results in better sleep patterns and growth.^{58,88} However, there are potential complications, including infant falls and sudden unexpected postnatal collapse, when SSC is not appropriately monitored. When SSC is performed in the NICU, close monitoring is important, and the parent should be educated about the dangers of sharing a sleep surface, whether in the hospital or home. Although parents may unintentionally fall asleep with their infant at home, this is especially dangerous with the preterm or low birth weight infant.^{3,13,89} Thus, it is important to reinforce safe sleep education when mothers are rooming-in with their infants and are not under the constant observation of NICU staff. The risk of falls and sudden unexpected postnatal collapse should be mitigated by conducting frequent assessments and monitoring of the mother-infant dyad for maternal fatigue. If the caregiver is becoming drowsy while caring for the infant, then the infant should

be moved to a separate sleep surface.⁸⁷

THERMOREGULATION

In the NICU, thermoregulation issues tend to focus on the prevention of hypothermia, because it is well established that achieving normothermia optimizes outcomes, including reductions in mortality. Preterm infants have more difficulty with thermoregulation than term infants; however, this improves with maturation.⁹⁰ Although weight-based criteria for weaning from the incubator to open bassinet varies among NICUs, a Cochrane review found that transfer out of thermoregulatory support at a weight of 1600 g did not adversely affect temperature stability or weight gain.⁹¹⁻⁹⁴

As preterm infants stabilize in an open environment, attention should be redirected from hypothermia to modeling safe sleep with the prevention of overheating and overbundling. Families should be educated on evaluating the infant for signs of overheating, such as sweating or the torso feeling hot to the touch.² Parents should also be warned about the potential for head covering, including hats, to contribute to overheating and thermal stress. A recent article found that in a large cohort of preterm infants, the failure rate attributable to hypothermia for transitioning out of supplemental heat without a hat was 2.7%.⁹⁵ Given the questionable benefit of hat use and the potential for overheating with head coverings, clinicians should carefully weigh the risks and benefits regarding the discharge of an infant from the NICU with a hat. If the infant is discharged wearing a hat during sleep, the clinician should provide education to the family regarding discontinuation once the infant achieves stable temperatures in the home environment. This should include education about how to

determine that the infant's temperature is stable.

SWADDLING

In the NICU, swaddling, or the snug wrapping of an infant in a light blanket, is an important part of developmentally sensitive care. When swaddled, preterm infants should be placed in the supine position, have their hands brought to midline under the chin, and hips and knees should be in the flexed position and able to move freely.⁹⁶ Swaddling may be useful in helping preterm infants maintain a normal temperature.

Swaddling is also commonly used in the care of infants with NOWS. Although no studies specifically address swaddling in this population, it has been suggested that it is beneficial in decreasing excessive crying and promotion of sleep.^{39,40} This may be related to inhibition of the Moro reflex when swaddling with the arms tucked in the swaddle.

When infants are swaddled, wearable blankets (which often have a swaddle wrap component) are preferred to conventional blankets for providing warmth while preventing head covering. Proper swaddling technique should allow the hips to be flexed and abducted to reduce the risk of exacerbating developmental dysplasia of the hip.⁹⁷

Because there is a much greater risk of sudden unexpected death if infants are swaddled and then placed in a nonsupine position,⁹⁷⁻¹⁰⁰ care must be taken to always place swaddled infants supine. In addition, when the infant begins to attempt to roll over, swaddling should be discontinued.

HUMAN MILK AND BREASTFEEDING

There are numerous benefits to breastfeeding, including decreased

risk of infection and decreased risk of allergies, asthma, eczema, obesity, inflammatory bowel disease, high cholesterol, type 1 diabetes mellitus, SIDS, and possibly some childhood cancers.¹⁰¹⁻¹⁰⁴ In the preterm infant, human milk has also been shown to improve feeding tolerance and reduce the risk of necrotizing enterocolitis.¹⁰⁵⁻¹⁰⁸

Given both the early and long-term benefits for the preterm infant, clinicians should provide family education on the importance of human milk on admission to the NICU or earlier if possible.¹⁰⁹

Multidisciplinary teams should be available to support breastfeeding and expression and provision of mother's milk, not just during the hospitalization but also after discharge for the transition to direct breastfeeding at home.^{110,111}

A RATIONAL APPROACH TO TRANSITION OF THE NICU PATIENT TO A HOME SLEEP ENVIRONMENT

Programs to model and teach safe infant sleep in both the newborn nursery and the NICU have been developed.^{8,11,68-73,112,113} These programs typically include standardized policies for infant sleep safety consistent with AAP recommendations, education for both staff and families, visible educational prompts, modeling of safe sleep, and audits for quality improvement. One NICU study demonstrated maintenance of improvement at 6-month audits after intervention, with 98% of infants lying supine in open cribs, 93% in a wearable blanket, and 88% of bassinets with a visible safe sleep card.⁷¹ Furthermore, standardized programs have been associated with higher rates of supine sleep and other safe sleep behaviors in the home.^{11,72,73}

One of the challenges in transitioning the NICU patient to a safe home

sleep environment relates to resolving therapeutic positioning practices for the infant that are inconsistent with sleep safety at home. Although the AAP through its Committee on Fetus and Newborn recommends that “hospitalized preterm infants should be kept predominantly in the supine position, at least from the postmenstrual age of 32 weeks onward, so that they become acclimated to supine sleeping before discharge,”⁵ not all infants will be clinically ready to be maintained in such a sleep environment at that age. To manage clinical variability, algorithms have been developed on the basis of literature review, expert opinion, and unit consensus.^{11,114} Quality improvement programs using these algorithms have demonstrated more consistent modeling in the NICU and improved parental adherence with safe sleep practices after hospital discharge.^{11,114} In one study, 2 Massachusetts community NICUs improved overall adherence with practices consistent with sleep safety at home from 25.9% to 79.7% ($P < .001$),¹¹⁴ and this standardized approach to integrating these safe sleep practices into routine NICU care was adopted by all NICUs statewide.¹¹⁵ In another study, a decision-guiding algorithm led to significant improvement in both NICU staff and parental compliance, with safe sleep practices in the home increasing from 23% to 82% ($P < .001$).¹¹

Creating a culture of infant sleep safety in the NICU setting can be challenging. Resistance to change is common, so consensus-building is essential to success. An algorithm such as that published by Gelfer et al¹¹ can be used as a starting point for the input of a multidisciplinary team including all of those involved with the care of the infant, including but not limited to physicians, advanced practice providers, nursing staff,

lactation consultants, respiratory therapists, and developmental therapists (physical therapy, occupational therapy, speech therapy).

Clinicians must address the acute physiologic needs of the NICU infant; incremental transition to a safe home sleep environment can begin as these needs resolve. Because preterm infants are at increased risk of SUID, clinicians should provide regular, repetitive, and consistent safe sleep education with families throughout the hospitalization. Through messaging with not only words but also modeling behaviors, clinicians will enable NICU families to be better prepared for the transition to a safe home sleep environment.

RECOMMENDATIONS

Overall recommendations for transition to safe home sleep for the NICU patient are provided below. Table 1 summarizes transition issues as pertaining to infant sleep safety.

1. The intensive care nursery should develop a safe sleep policy incorporating the points below, with the goal of transitioning the infant to a safe home sleep environment consistent with the recommendations of the AAP Task Force on SIDS.^{8,69,72,112,113,116–120}
2. The NICU should use an algorithm for routine and repeated evaluation of each NICU infant for safe home sleep readiness.^{11,114,115}
3. Incremental implementation of components of a safe sleep environment can be implemented for NICU infants not ready to completely transition to a safe home sleep environment (eg, the infant may be ready for supine positioning but may still need positioners for plagiocephaly).^{11,114,115}

4. All staff involved in the care of NICU infants should receive education on and maintain expertise in infant sleep safety, including the AAP recommendations, hospital policy, and transitional algorithm.*
5. Family education regarding infant sleep safety should be provided early and often throughout the hospital course.[†] Multiple communication strategies (bedside cards, whiteboards) should be used to increase parental awareness and provide anticipatory guidance for NICU infants who are not clinically ready to transition to a safe home sleep environment. One example is a bedside card denoting that the infant is receiving therapeutic positioning because of prematurity or illness.^{11,114,115,121}
6. When the infant is deemed ready for transition to a safe home sleep environment, the therapeutic positioning card should be replaced with messaging that the infant is now being maintained in a safe sleep environment.^{11,114,115,121}
7. When the infant transitions to the safe home sleep environment, consideration should be given to using this opportunity to provide formal safe sleep education for the family and celebrate the event on par with a developmental milestone.^{11,114,115,121}
8. If an infant has a clinical deterioration after going into a safe home sleep environment, then therapeutic positioning may need to be reinstated. As soon as the infant is clinically stable again, he or she should be

*Refs 8, 11, 69, 72, 73, 112–115, 118, and 120–123.

†Refs 8, 11, 68–70, 72, 112, 113, 118–120, and 122–125.

TABLE 1 NICU Transition to a Safe Home Sleep Environment

Respiratory distress ^{11,14,16,17,24,66,112,114}	<ol style="list-style-type: none">For the infant with acute respiratory distress, regardless of gestational age, nonsupine positioning may be used as clinically indicated to stabilize/improve respiratory function.If nonsupine positioning is used, especially as the infant matures, parents should be educated about infant home sleep safety and the reasons for using therapeutic positioning.Once the acute respiratory distress is resolving, the infant should be placed supine for modeling infant home sleep safety, and the parents should receive additional education before hospital discharge.For infants who have developed chronic lung disease, periodic assessments should be performed to monitor the infant's progress. Once the infant has weaned to a standardized minimal supplemental respiratory support (determined by the individual institution), then supine positioning can be maintained, and parents should receive additional education before hospital discharge.The management of the infant with upper airway obstruction needs to be individualized on the basis of the severity of the obstruction. Nonsupine positioning may be necessary to prevent excessive hypercarbia or hypoxemia and consideration should be given to home monitoring of the marginal airway.
Apnea of prematurity ^{27–29,134}	<ol style="list-style-type: none">There is inadequate evidence to justify the use of prone positioning for the treatment of apnea of prematurity.For more information on apnea of prematurity, please refer to the clinical report on apnea of prematurity from the AAP.¹³⁴
Gastroesophageal reflux and GERD ^{4,30,33}	<ol style="list-style-type: none">Gastroesophageal reflux is extremely common in infants in the NICU.Because of the increased risk of SUID, infants with gastroesophageal reflux or GERD should not have the head of the bed elevated, nor should they be laid down on their side or prone.For more information refer to the clinical report on gastroesophageal reflux in the preterm infant by the AAP.
Hyperbilirubinemia and phototherapy ^{36,38,135,136}	<ol style="list-style-type: none">There is no benefit to changing infant position while undergoing phototherapy.Unless there are other competing medical issues, infants should be kept supine while receiving phototherapy to model and promote infant home sleep safety.
NOWS ^{2,39–41}	<ol style="list-style-type: none">There are some commonly used therapeutic interventions in the treatment of NOWS (ie, prone positioning) that are not consistent with infant home sleep safety.Early and frequent education is critical to prevent families from thinking that the proper use of therapeutic interventions in the hospital can be replicated in the home environment.The use of therapeutic interventions that are not consistent with infant home sleep safety should be minimized. When interventions are necessary, it is important to review their use and attempt to transition to a safe home sleep environment as soon as clinically stable.Clear, consistent, safe home sleep messaging should be emphasized repeatedly with families of infants with NOWS throughout the hospitalization.
Developmentally sensitive care ^{11,71,112,114,119}	<ol style="list-style-type: none">Developmentally sensitive care is an important component to the health and well-being of the preterm infant.Although many of the tools and therapies used to promote developmentally sensitive care are not consistent with a safe home sleep environment for infants, parental observation of these techniques can serve as a teachable moment for eventual safe sleep readiness.It is important to transition infants to a safe home sleep environment as early as possible before NICU discharge.Good communication with the use of a multidisciplinary team is key for consistent transitioning of NICU patients to a safe infant home sleep environment (see A Rational Approach to Transition of the NICU Patient to a Home Sleep Environment for details).
DP and torticollis ^{2,77–82}	<ol style="list-style-type: none">Positioning devices recommended by qualified personnel, such as but not limited to occupational and physical therapists, can be used to prevent, control, and correct DP and torticollis while infants are under continuous monitoring in the NICU.Parents need to be educated regarding the use of sleep positioning devices: that their use is limited to the inpatient setting under strict monitoring, and that they are not part of a safe home sleep environment.Education regarding tummy time should emphasize that it be performed during awake, supervised periods only and never when the infant is asleep, even with “close” supervision.
Thermoregulation ^{2,90,94,99,100,137–140}	<ol style="list-style-type: none">Preterm and low birth weight infants are prone to temperature instability and may require additional bundling to avoid hypothermia.Excessive bundling needs to be avoided because overheating and head covering have been associated with an increased risk of SUID.If an infant is discharged wearing a hat, families should be counseled to discontinue its use once the infant demonstrates temperature stability in the home environment.If swaddling is performed, it is important that it is done properly, the infant is always placed supine, and it is discontinued before the infant is able to roll over.
DDH ^{97–100}	<ol style="list-style-type: none">Infants are frequently swaddled in the NICU when approaching hospital discharge; however, improper swaddling can lead to or exacerbate DDH. Proper swaddling technique should allow the hips to be flexed and abducted.Parents should be well-educated about all safety issues regarding swaddling, in particular the increased risk of SUID with nonsupine positioning.For more information refer to the clinical report on DDH by the AAP.
Human milk and breastfeeding ^{2,87,89,101–104,110,111}	<ol style="list-style-type: none">The use of human milk is recommended for its numerous health benefits, including a reduced risk for SIDS.Special care should be taken when mothers are rooming-in and breastfeeding to minimize the risk of falling asleep with the infant in the adult bed.Provide mothers with appropriate outpatient support to optimize breastfeeding success after hospital discharge.

DDH, developmental dysplasia of the hip.

returned to a safe home sleep environment.^{11,114,115,121}

9. Before hospital discharge, all NICU families should receive standardized safe infant sleep education and be queried about a safe home sleep environment followed by applicable counseling.[‡]
10. If the family does not have the means for a safe home sleep environment, then a referral should be made to social work for assistance and/or referral to resources that can provide cribs or portable play yards at low or no cost.^{126–129}
11. Crib audits should be an integral component of a NICU safe sleep program to monitor success or identify areas for improvement. Consider the use of run charts to allow staff to see real-time feedback on whether an intervention is working. This is integral for determining the need for and implementation of plan-do-study-act cycles.[§]
12. Consideration should be given to incorporating safe sleep education into the electronic medical record. Examples include assessments for a safe sleeping home environment and alerts to perform the assessment and complete the education.^{130–133}
13. Include primary and ancillary care providers and neurodevelopmental teams in preparation for a smooth transition to home that includes maintenance and

reinforcement of a safe home sleep environment.

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ABBREVIATIONS

AAP: American Academy of Pediatrics
DP: deformational plagiocephaly
GERD: gastroesophageal reflux disease
NICE: National Institute for Health and Clinical Excellence
NOWS: neonatal opioid withdrawal syndrome
SIDS: sudden infant death syndrome
SSC: skin-to-skin care
SUID: sudden unexpected infant death

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Transition to a Safe Home Sleep Environment for the NICU Patient
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